

Example 1

Table

PS	NS		
	ABC	DEF	ABC
000	011	011	011
001	010	010	010
010	101	101	101
011	100	100	100
100	101	101	101
101	111	111	111
110	111	111	111
111	000	000	000

Table 2

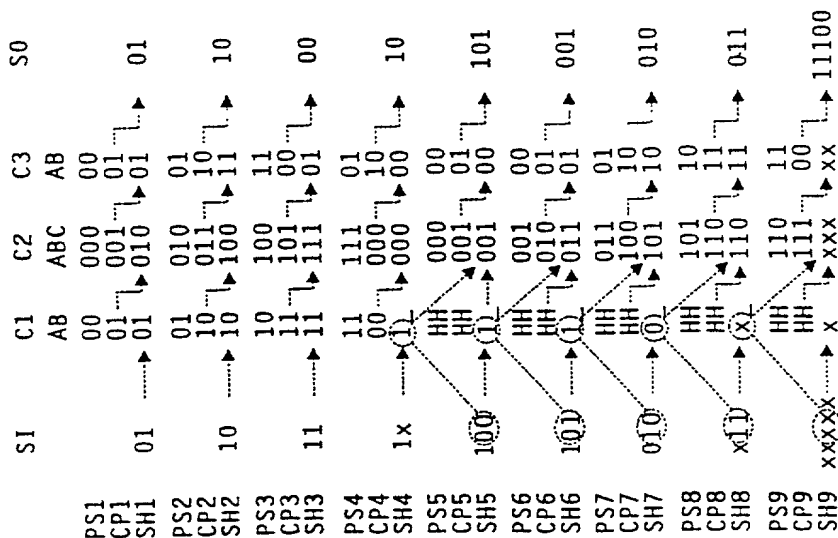
PS		NS	
ABC	DEF	DEF	ABC
000	001	001	001
001	110	110	110
010	011	011	011
011	100	100	100
100	101	101	101
101	110	110	110
110	111	111	111
111	100	100	100

C1 Table

PS		NS	
ABC	DEF	ABC	ABC
000	010	010	010
001	010	010	010
010	011	011	011
011	110	110	110
100	101	101	101
101	110	110	110
110	011	011	011
111	110	110	110

$$\text{Conventional Scan Test Clocks} = \text{Capture Clocks} + \text{Shift Clocks} = 8 + 72 = 80$$

Example 3



C1 Table

PS	NS	
	AB	CD
00	01	01
01	10	10
10	11	11
11	00	00

C2 Table

PS	NS		
	ABC	DEF	ABC
000	001	001	001
001	010	010	010
010	011	011	011
011	100	100	100
100	101	101	101
101	110	110	110
110	111	111	111
111	000	000	000

C3 Table

PS	NS	
	AB	CD
00	01	01
01	10	10
10	11	11
11	00	00

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 9 + 25 = 34

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 56 = 64

Example 4

C1 Table

PS	NS
ABC	DEF ABC
000	001 001
001	010 010
010	011 011
011	100 100
100	101 101
101	110 110
110	111 111
111	000 000

C2 Table

PS	NS
AB	CD AB
00	01 01
01	10 10
10	11 11
11	00 00

C3 Table

PS	NS
AB	CD AB
00	01 01
01	10 10
10	11 11
11	00 00

SI	C1	C2	C3	S0
	ABC	AB	AB	
PS1	000	00	00	
CP1	001	01	01	
SH1	001	00	10	101
PS2	001	00	10	
CP2	010	01	11	
SH2	010	01	00	111
PS3	010	01	00	
CP3	011	10	01	
SH3	011	01	11	001
PS4	011	01	11	
CP4	100	10	00	
SH4	100	10	01	000
PS5	100	10	01	
CP5	101	11	10	
SH5	101	10	11	110
PS6	101	10	11	
CP6	110	11	00	
SH6	110	11	01	100
PS7	110	11	01	
CP7	111	00	10	
SH7	111	11	10	010
PS8	111	11	10	
CP8	000	00	11	
SH8	xxx	xx	xx	0000011

Tests: C1 000-001, C2 00-01, C3 00-01 decode

Tests: C1 001-010, C2 00-01, C3 10-11 decode

Tests: C1 010-011, C2 01-10, C3 00-01 decode

Tests: C1 011-100, C2 01-10, C3 11-00 decode

Tests: C1 100-101, C2 10-11, C3 01-10 decode

Tests: C1 101-110, C2 10-11, C3 11-00 decode

Tests: C1 110-111, C2 11-00, C3 01-10 decode

Tests: C1 111-000, C2 11-00, C3 10-11 decode

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 28 = 36

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 56 = 64

Example 5

	SI	C1	C2	S0	
PS1		ABC	ABC		
CP1		000	000		
SH1	001	001	010	010	Tests: C1 000-001, C2 000-010 decode
PS2		001	001		
CP2		010	011		
SH2	010	010	010	011	Tests: C1 001-010, C2 001-011 decode
PS3		010	010		
CP3		011	100		
SH3	011	011	011	100	Tests: C1 010-011, C2 010-100 decode
PS4		011	011		
CP4		100	101		
SH4	100	100	100	101	Tests: C1 011-100, C2 011-101 decode
PS5		100	100		
CP5		101	110		
SH5	101	101	101	110	Tests: C1 100-101, C2 100-110 decode
PS6		101	101		
CP6		110	111		
SH6	110	110	110	111	Tests: C1 101-110, C2 101-111 decode
PS7		110	110		
CP7		111	000		
SH7	111	111	111	000	Tests: C1 110-111, C2 110-000 decode
PS8		111	111		
CP8		000	001		
SH8	xxxxxx	xxx	000	000001	Tests: C1 111-000, C2 111-001 decode

C1 Table

PS	NS
ABC	DEF ABC
000	001 001
001	010 010
010	011 011
011	100 100
100	101 101
101	110 110
110	111 111
111	000 000

C2 Table

PS	NS
ABC	DEF ABC
000	010 010
001	010 011
010	100 100
011	100 101
100	110 110
101	110 111
110	000 000
111	000 001

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 27 = 35

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 48 = 56

Example 70

SI	C1 ₁ ABC	C1 ₂ ABC	C1 _{N-1} ABC	C1 _N ABC	S0
PS1	000	000	000	000	
CP1	001	001	001	001	
SH1	001	001	001	001	001
PS2	001	001	001	001	
CP2	010	010	010	010	
SH2	010	010	010	010	010
PS3	010	010	010	010	
CP3	011	011	011	011	
SH3	011	011	011	011	011
PS4	011	011	011	011	
CP4	100	100	100	100	
SH4	100	100	100	100	100
PS5	100	100	100	100	
CP5	101	101	101	101	
SH5	101	101	101	101	101
PS6	101	101	101	101	
CP6	110	110	110	110	
SH6	110	110	110	110	110
PS7	110	110	110	110	
CP7	111	111	111	111	
SH7	111	111	111	111	111
PS8	111	111	111	111	
CP8	000	000	000	000	
SH8	xxx...xxx	xxx	xxx	xxx	000...000

C1 Table

PS	NS
ABC	DEF ABC
000	001 001
001	010 010
010	011 011
011	100 100
100	101 101
101	110 110
110	111 111
111	000 000

P = Circuit's test pattern count
L = Circuit's scan path length
C = Capture clock per test pattern
N = Number of circuits

Warping Scan Test Clocks = $P(C+L) + NL-L$
Conventional Scan Test Clocks = $P(C+NL)$

For large L & P

Warping Scan Test Clocks = $L(P+(N-1))$
Conventional Scan Test Clocks = LPN

For L=2000, P=1000, N=1

Warping Scan Test Clocks = 2,000,000
Conventional Scan Test Clocks = 200,000,000

For L=2000, P=1000, N=100

Warping Scan Test Clocks = 2,198,000
Conventional Scan Test Clocks = 200,000,000

For L=2000, P=1000, N=1000

Warping Scan Test Clocks = 3,998,000
Conventional Scan Test Clocks = 2,000,000,000